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coni, sent out by the Milan Geographical Society, was murdered by the Somalis on August 5th. The Sultan of Ogaden had warned him not to proceed on account of the state of war that prevailed, but S^r Sacconi continued onward until he was surrounded by 5000 men. In the course of the night five Somalis suddenly attacked the traveler's tent while the guards were asleep and killed S^r Sacconi with their knives. All his notes are lost, and his diary burned.—Captain Dawson and party, of the British Circumpolar Expedition, which wintered at Fort Rae, arrived safe and well at Winnipeg on Nov. 2.—Lieut. Hovgaard, in reply to an inquiry from Baron Nordenskjöld, states that he could have navigated the Kara sea and reached the Yenisei last year had he not, by signals of distress from the *Varna*, been compelled to leave the lead along the shore of Waigatz island. The lead was open as far as the eye could reach.—In the vicinity of Bona, Algeria, the Naiba, an isolated mountain 800 meters high, is gradually descending into the earth, forming a deep excavation round the sinking mass.

GEOLOGY AND PALÆONTOLOGY.

RESULTS OF THE DEEP-SEA WORK OF THE "TALISMAN."—M. Alphonse Milne-Edwards has communicated to the French Academy some preliminary reports of the results of the work of the deep-sea explorations conducted by the French government during the past season. The work was carried on from the Gulf of Gascony to the Cape Verde islands, and then north-westward to the Sargassum sea, north-eastward to the Azores, and back to France. As far south as the exploration extended, the great depths were found to be occupied by an arctic fauna, totally distinct in character from that inhabiting the lesser depths. The difference, says M. Milne-Edwards, is like that distinguishing the faunæ of distinct geological horizons. Between the Azores and France the bottom is covered with deep white slime composed of the shells of *Globigerina*. Fragments of pumice and other rocks are common, some of the latter containing fossils, among others *Trilobites*. There were also found, 700 miles from the coast of France, polished and striated pebbles of glacial origin, which M. Milne-Edwards thinks were dropped there by icebergs.

These discoveries show how transpositions of faunæ which present different chronological characters, such as the occurrence of Barrande's colonies, may take place. Oscillations of the ocean bed or shore on a sufficient scale are all that is necessary. Elevation of the ocean bottom sufficient to connect New Guinea with Celebes or Borneo, would give the same result, a Mesozoic or Eocene mammalian fauna would supervene on a modern one. The invasion of North America during the Pliocene period by the South American *Edentata*, was a case of an inferior fauna succeeding a superior one.—*E. D. Cope.*

THE EOCENE FAUNA OF PATAGONIA.—In a recent issue of the *Revue Scientifique* M. Trouessart gives an account of the Eocene fauna of Southern Patagonia. The great discoverer in this direction has been Señor F. P. Moreno, of the Buenos Ayres Museum, who, with five persons and a canoe drawn by horses, ascended the Santa Cruz river beyond the point reached by Darwin, and discovered lakes Argentine, Viedma and San Martin, all fed by the glaciers of the Andes. The middle course of the river, though desolate as the lower, is grander, and the outlines of the hills at once reminded Sr. Moreno of the *Mauvaises Terres* of Nebraska and New Mexico. The upper course traverses the great forest of beeches that has replaced the palms of the Tertiary epoch, and the richness of the flora contrasts greatly with the aridity of the lower regions. In a little cavern was found the mummified body of a man, wrapped in feathers of the rhea and painted like the mummies of Arizona. This mummy marks the previous existence of a people less barbarous than the scattered tribes that now inhabit the country.

On the left bank of the middle course, at a point passed but not noticed by Darwin, was discovered the rich fossiliferous beds, the treasures of which now enrich the Museum of Buenos Ayres. The current is so rapid and the stream so narrow at the passage of this formation, the beds of which are almost vertical, that it is no wonder that Darwin's attention was otherwise occupied when passing. These difficulties caused the collections made by Sr. Moreno to be far smaller than they would otherwise have been.

One of the principal remains is a large skull, incomplete anteriorly; this skull was described under the name of *Astrapotherium patagonicum* by Burmeister. According to Señor Moreno the upper surface is convex; there are no horns, and while enormous canines are present, there are but three or four molars or premolars on each side of the upper jaw. It presents very generalized characters, its only molar is marsupial, while the form of the skull approaches that of the carnivores, so that it may be supposed to be a great transitional marsupial of aquatic habits. The brain is very much reduced. Another species is a true marsupial which Sr. Moreno has described under the name of *Palæotherium aratæ*. The same locality has furnished a portion of the mandible of Owen's *Nesodon imbricatus*, and two molars of *Toxodon patagoniensis*, both from a more modern horizon than *Astrapotherium*. In the same bed with *Toxodon*, Sr. Moreno has found also the skulls of two smaller animals, which together constitute a complete transition between the toxodonts and the rodents. One of these is named *Toxodontophanus australis*, while the other, nearer to the rodents, is styled *Interatherium rodens*.

Tembotherium holmbergii is a true rodent from the Santa Cruz beds. M. Lista, in his voyage to the sources of the River Chico,

had previously found a cranium of an *Anchitherium*, as well as of *Nesodon*. Dr. Cunningham had discovered in the Lower Tertiary of the Gallegos river an ungulate described by Flower as *Homalodontherium cunninghamii*, and d'Orbigny had found the rodent-like *Megamys patagoniensis*. Two molars, with a fragment of skull, discovered by M. Moyzes in a bed which is believed by Sr. Moreno to form the passage from Cretaceous to Tertiary, might have belonged either to a gigantic capybara or a small elephant, and formed part of what is probably the oldest known South American mammal. Sr. Moreno has named it *Mesotherium marshii*.

Dr. Cunningham was the first to find remains of Edentata in the Tertiary, by the discovery of some plates of a *Glyptodon* on the Gallegos river. In the upper horizon of the Santa Cruz beds Sr. Moreno has found fragments of the cuirass of *Hoplophorus australis*, and the Museum of Buenos Ayres has the humerus of a *Mylodon* from a Tertiary deposit near the Rio Colorado.

In the Bay of Santa Cruz, at the base of the marine Tertiary, Sr. Moreno found the skull of an enormous cetacean so firmly imbedded in the rock that he could only extricate the cervical vertebræ and a portion of the occipital region. This species he has named *Palæobalæna bergii*. Remains of another cetacean species, *Sauroctes argentinensis*, were also found, as well as fragments of some dolphins, of some seals from the Chubut river, and of birds, etc. The discovery of these remains tends to show that the Tertiary fauna of Patagonia preceded that of the Argentine Republic, and if the list of the Patagonian Tertiary fauna is small, it is probably because it is as yet incomplete.

It was previously supposed, on the faith of the observations of d'Orbigny, Burmeister and Darwin, that Patagonia was entirely composed of marine Tertiary deposits, but it is now demonstrated that terrestrial and lacustrine deposits are largely represented.

The presence of so rich a Tertiary fauna in Patagonia lends weight to Sr. Moreno's opinion that at the commencement of this period a southern continent existed, spreading over the present bed of the Atlantic and Pacific, and that the fauna of this country spread northward towards the equator at the time when the glacial epoch had set in in Southern Patagonia. Traces of local emersions and immersions, as well as traces of an abundant vegetation advancing to the sea, occur in many points of Patagonia, which at that period evidently enjoyed a warmer climate. At the present time the southern point of the South American continent appears to be slowly sinking, and soundings in the Atlantic show that a rise of less than 150 meters would unite the Falkland isles and Tierra del Fuego with the continent, which would then, at the latitude of the Santa Cruz river, have the width of Africa at Orange river. A further rise of 2000 meters would unite this land with South Georgia and other antarctic lands, and the kind

of hook towards the east formed by Tierra del Fuego and Staten island, indicates the direction of the crest of this submerged continent. This subsidence of Patagonia, following an elevation which has left salt lakes with still-living marine species 200 feet above the sea, is balanced by an elevation to the north of the Rio de la Plata. There the same upward movement of submarine formations which has caused the canal to the east of the Patagonian Andes to be abandoned by the sea, while that to the west parts off a chain of multitudinous islands, is now in operation farther north. Modern alluvium, formed by great lakes fed by the melting glaciers, have filled up the old sea-canal to the east of the Patagonian Andes. An alternation of partial subsidences and elevations, such as are now acting, allowed the fauna to persist, and caused that alternation of marine and terrestrial beds which is observable.

Towards the middle of the Tertiary period, the two Americas were as yet disunited, Southern Brazil was a great island, the ocean filling the basins of the Amazons and the La Plata; the mass of the Columbian mountains stretched to the north, while Bolivia and Patagonia, now separated from the southern continent, formed a vast peninsula. The numerous groups of islands dotted over the Pacific seem to be the remains of the submerged continent which united Australia to South America. According to Hooker, not less than seventy-seven species of plants are common to New Zealand, Tasmania and South America, whilst very few cosmopolitan genera are common to these regions. The presence of marsupials is another link between Australia and South America.

Probably Australia was parted off at the end of the secondary period, while South America was still a portion of the southern continent. The marsupials were thus divided and evolved separately in their two seats, while in the Miocene the edentates appeared in Patagonia.

The red sandstone, probably Cretaceous, which occurs in the triangle formed by the rivers Limay and Neuquen, and contains the remains of *Mesotherium*, is probably the oldest formation known in Patagonia, and extends over a large area to the south and south-west. An ancient shore near Lake Argentine proves the subsidence of Patagonia toward the end of the Tertiary period.

Sr. Moreno believes that the present relief of Patagonia is the result of volcanic eruptions which, towards the end of the Tertiary, were repeated from Tierra del Fuego to Brazil. Under the influence of these Patagonia rose again, but the antarctic ice had advanced and the land was glaciated. The pampean formation is the result of the far-spreading glaciation produced, in Sr. Moreno's opinion, by astronomical causes, and the remains found in it were carried by the ice from more southern parts—not a single complete skeleton is found in the true silt of the lower pampean.

The cold spread northwards to Chili, Bolivia, even Brazil, and most of the animals perished. A few of the hardiest, as the guanaco, llama, vizcacha, puma, armadillo and rhea again spread southwards when the glacial era passed, but the great edentates found neither the mild climate nor the abundant vegetation that suited them, and remained in the as yet marshy pampa. At this epoch the mastodons which had penetrated by the Isthmus of Panama, appeared upon the scene. The extinct fauna found in Patagonia must be that indigenous to the country, for since no animal leaves its country unless forced thereto by the struggle for life, it is unlikely that Brazil and Bolivia were abandoned for desolate Patagonia.—*Dr. Trouessart in Revue Scientifique.*

SCHLOSSER ON ANOPLOTHERIUM.—Herr Schlosser, of Munich, has dispelled the uncertainty respecting the relations of the genera Anoplotherium and Eurytherium. He finds that the peculiar second digit of the hind foot which characterizes the latter, belongs as well to the former, and that the name Eurytherium is a synonym. This digit, extending nearly at right angles to the others, was probably connected with them by a web, according to Schlosser, who agrees with Cuvier that the habits of these animals were aquatic. He refers three genera to the Anoplotheriidae, with the following numbers of species. Anoplotherium Cuv., three sp.; Diplobune Fraas, three sp.; Dacrytherium Filh., one sp.

ELEVATED CORAL REEFS OF CUBA.—Mr. W. O. Crosby (Proc. Bost. Soc. Nat. Hist.) describes the elevated coral reefs of Cuba, and from them draws inferences adverse to those drawn by Professor A. Agassiz from examination of the Florida reefs. Four coral terraces extend, with slight interruptions, round the entire Island of Cuba. In the western part of the island they are the predominating formation, and are well preserved on the summits of the highest hills, but further east erosion has been more rapid. The lowest terrace, on the northern side of the island, rises thirty feet, the second rises abruptly 200 to 250 feet above it, the third is about 500 feet high, and the fourth has a height of probably not less than 800 feet near Baracoa. Five miles west of Baracoa 1000 feet of the upper part of a mountain is reef limestone and originally the formation must have been 2000 feet thick. The thickness of the reefs here and upon the Island of Jamaica, where the elevated reefs reach a thickness of 2000 feet, is considered by Mr. Crosby to prove that they were formed in shallow water during a period of slow subsidence, according to the theory of Darwin.

There does not appear to be any reason to doubt Mr. Crosby's conclusions in this case, neither does there appear to be any reason to doubt those of Professor Agassiz in that of the Florida reefs. The latter authority does not endeavor to set aside the

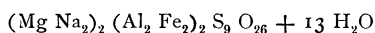
theory of Darwin, but to show that in some cases, at least, coral reefs are but the summit of an elevation formed by other agencies. In cases of subsidence the reefs are thick, while in regions of elevation, as in Florida, the coral reef is but a thin crust topping a bank of deposited matter.

MINERALOGY¹.

GRODDECKITE—A NEW ZEOLITE.—A. Arzuni describes a zeolite from St. Andreasberg, in the Harz, which, while closely resembling gruelinite in form and physical properties, contains iron and magnesia in place of paticis of the aluminum and lime, and is to be regarded as a new variety of gruelinite. It is described as occurring in small crystals upon calcite, containing in their form the rhombohedron, scaleushedron and hexagonal prism, and possessing a prismatic cleavage, and a hardness of between 3 and 4. The composition is:

SO ₂	Al ₂ O ₃	F ₂ O ₃	CaO	MgO	Na ₂ O	H ₂ O
					(by difference)	
51.2	12.0	7.7	1.1	3.8	4.5	20.2 = 100

and the formula



is adduced, the mineral being regarded as a magnesia-iron gruelinite.

It is named from Dr. A. von Groddeck, the director of the museum at Clausthal, in which the specimen was found.

HERDERITE FROM MAINE.—Mr. U. E. Hidden, well known for his mineralogical discoveries in North Carolina, announces² the probable occurrence of the rare mineral Herderite at Stoneham, Maine. The crystals are short, truncated prisms, transparent to translucent, colorless or faintly yellowish. Hardness 5, sp. gravity 3. The crystals are orthorhombic with $1 \wedge 1 = 116^\circ$. It resembles topaz in form and color, but has neither the cleavage nor the hardness of that mineral. An analysis is now being made. Professor E. S. Dana gives some crystallographic measurements which closely approximate the angles of herderite.

RECENT METEORITES.—A large meteorite fell last February near Brescia, Italy. It was about half a metre long and of a conical shape. It buried itself a metre deep in the earth, singeing the grass in the neighborhood, and when dug out was still warm, and the smell of sulphur was distinctly noticeable. Although the meteorite passed through the air in a S. S. E. direction, it forced its way into the earth obliquely in an opposite direction.

About a year earlier, in February, 1882, a great meteor burst in a cloudless sky in Transylvania. A large ball of fire seen through-

¹ Edited by Professor H. CARVILL LEWIS, Academy of Natural Sciences, Philadelphia, to whom communications, papers for review, etc., should be sent.

² *Am. Jour. Sci.*, Jan., 1884, p. 73.